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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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## ASTRONAUTICS

# Moon's Air Blown Away

Solar winds have reduced the moon's possible atmosphere by a factor of a billion. The earth's magnetic field protects it from the solar wind.

► THE SOLAR winds that blow energetic particles into the outer Van Allen radiation belt also blow most of the moon's atmosphere into space.

Dr. Robert Jastrow of the National Aeronautics and Space Administration told a symposium on problems in space exploration that the solar wind reduces the moon's possible atmosphere by a factor of a billion. The symposium was sponsored by the National Academy of Sciences-National Research Council, the American Physical Society and NASA.

Dr. Jastrow said that any atmosphere the moon might have would consist of argon produced by the decay of radioactive potassium-40, and small amounts of water, sulfur dioxide and carbon dioxide produced by volcanic activity, if any. The earth's magnetic field protects it from the solar wind, trapping the particles in the outer radiation zone.

Instruments for the lunar probes to measure the moon's magnetic field and any particles that may be trapped by it were described by Dr. J. W. Townsend, also of NASA. He said the space vehicle, a follow-up of the Pioneer launchings that succeeded in putting a tiny man-made satellite into a sun-circling orbit, would weigh about 75 pounds.

Even if this lunar probe does not come very close to the moon, it will carry instruments so sensitive they can map the hydro-magnetic waves in space, giving a chart of

their intensity between the earth and the moon and beyond.

Dr. Townsend also reported on the instruments being planned for the next family of satellites and space probes to be launched within the next two years or so. They include vehicles to measure primarily: the structure of the earth's atmosphere; cosmic rays and energetic particles in space beyond the earth's immediate neighborhood; and the temperature, layers and electrical charges of the ionosphere. An astronomical vehicle with a stabilized observing platform also is planned.

Science News Letter, May 16, 1959

## PUBLIC SAFETY

## Three-Fourths of Fallout Caused by Soviet Tests

► SOVIET NUCLEAR bomb tests have been blamed for three-fourths of the strontium-90 fallout that everyone is talking about.

The increases in fallout that have occurred each spring for several years are largely due to Russian tests. These intermediate and high-yield weapons have injected debris into lower and intermediate levels of the stratosphere, Dr. E. A. Martell reports in *Science* (May 1).

Data on the fallout rates over various cities in the north temperate latitudes from 1952 through 1955 plus soil samples in several states have been studied. The striking spring peaks in fallout rate must be

attributed largely to stratospheric debris from Soviet bombs exploded previous winters, Dr. Martell of the Air Force Cambridge Research Center says.

Most fallout reaches the earth through rainfall. Some small amount of dry particles descends with the aid of the pull of gravity, the scientists say, but this amount is negligible.

Therefore, the seasonal distribution of rainfall also limits the strontium-90 distribution. High-yield atomic tests inject debris into the stratosphere where it proceeds to undergo diffusion throughout a broad region of the equatorial stratosphere and subsequently mixes poleward where roughly equal amounts "rain" down on both the Northern and Southern Hemispheres.

Commenting upon other weapon sources of fallout, Dr. Martell points out that middle-latitude detonations create clouds of debris that apparently reach lower stratospheric levels after only limited diffusion. These weapons release all of their contamination into a zone of restricted latitude during the first six months or so.

Detonations that do not exceed 100 to 200 kilotons inject contamination into the troposphere, about the first 40,000 feet of atmosphere. This strontium-90 is widely dispersed and accounts for only a few percent of total fallout to date, Dr. Martell says.

Dr. Willard F. Libby, Atomic Energy Commission, has stated that a "tremendous rise" in fallout rate occurred in October, 1958. It was found to be due to the Russian test series in the polar regions.

Science News Letter, May 16, 1959

## GEOPHYSICS

## Earth's Core Reported Not to Be Pure Iron

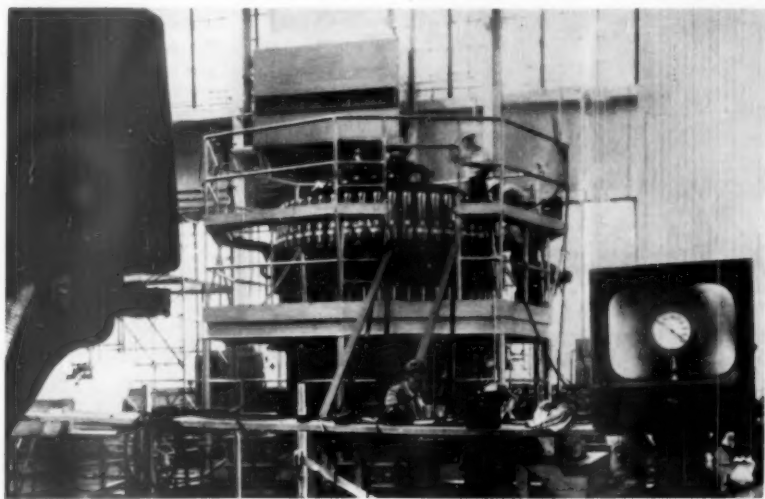
► EARTH'S CORE is not made of pure iron, as many scientists believe, but contains "significant amounts" of lighter weight elements.

Drs. Leon Knopoff and Gordon J. F. Macdonald of the University of California, Los Angeles, said the new make-up for the earth's center is based on Russian measurements of the compressibility of iron and eight other metals at extremely high pressures. They reported to the American Geophysical Union meeting in Washington that the density of iron at the pressure believed to exist at the boundary between the core and the mantle is 11.8. However, the density of the material at the core boundary is estimated to be between 9 and 10.

This difference can only be resolved by assuming that the core is not pure iron, they said, but contains alloying elements of lower atomic number than iron. The rate at which earthquake waves travel through pure iron at the pressure of the earth's core is also significantly different from that observed, indicating the presence of light materials.

A material with a mean atomic number of 23 in the core is consistent with earthquake wave observations and density measurements, Drs. Knopoff and Macdonald concluded.

Science News Letter, May 16, 1959



**GIANT FURNACE**—The 105-ton steel vessel that will become the "atomic furnace" for the N.S. Savannah, the world's first nuclear powered merchant ship, is shown at The Babcock & Wilcox Company's works where it successfully completed a hydrostatic pressure test of 3,000 pounds per square inch.



## ORNITHOLOGY

# Study Bird's Courting

Recent studies of the courting behavior of the unusual bowerbirds have given scientists important clues as to their evolution.

▶ A BIRD that flaunts his feathers before the female of his choice may be fairly low down on the evolutionary scale.

He might do better with a bright berry or two.

One study of bowerbirds indicates some of these birds have progressed from colorful feathers to colorful objects. One species in which the male has a bright crest on the nape of his neck goes through courtship motions that display the iridescent, lilac, silver-tipped crest. Another species, however, tries to attract the female bird's attention with a bright colored object, such as a piece of glass, a pebble or a spray of berries.

According to one theory, the male bird's bright crest can be lost as a secondary

result of the transfer of sexual signals from feathers to objects. Now observations of two bowerbirds seems to support this theory, E. Thomas Gilliard of the American Museum of Natural History reported.

Although the crestless male, the Fawn-breasted Bowerbird was the one Dr. Gilliard studied, lacks showy neck feathers, the bird still "twisted its neck in a most unnatural way so that the back of its head was aimed towards the female." As the courtship progressed the bird depended more on displaying with colorful objects.

Apparently, Dr. Gilliard pointed out, even the crest-displaying movements have been re-directed to berry-displaying movements. While the movements have persisted, they have become vestigial.



**BIRD COLLECTION**—More than 5,500 birds from the Indian continent have been collected by Harvard University zoologists Dr. Raymond A. Paynter Jr. (right) and Melvin L. Bristol. Mr. Bristol holds a crow while Dr. Paynter holds a bownbill. The large bird in the foreground is a stork. Yale University's Peabody Museum and Harvard's Museum of Comparative Zoology were co-sponsors of the expedition. Birds and other animals collected will be shared with the countries where they were collected. (This photograph is not related to the preceding story on bowerbirds.)

In another report appearing in the publication, *American Museum Novitates* (April 22), Dr. Gilliard describes what is believed to be the first observation of courting behavior of Sanford's Bowerbirds.

When the female comes to the bower (a mat of ferns and vines decorated with snail shells, resins and strands of gold-colored bamboo), the male assumes an infantile attitude. Its body is flattened and it chews, fluttering its wings like a young bird waiting to be fed. The female remains on low perches encircling the bower.

The advantage of this display is unknown, Dr. Gilliard said.

Science News Letter, May 16, 1959

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## GENERAL SCIENCE

# U. S.—Moscow Exhibit

A first-hand, "in person" view of American science and technology will be available to Russians for six weeks this summer at a Moscow park.

► THIS SUMMER about 3,500,000 Russians are expected to get a first-hand look at American science and technology, from rockets to nuclear reactors to smog control to antibiotics.

It all will be on view in Moscow's Sokolniki Park for six weeks, starting July 25 when Vice President Nixon officially opens the American National Exhibit. By reciprocal agreement, a Russian exhibit will open on June 28 at the Coliseum in New York.

Although the American exhibit will include how Americans live, work, play and learn, science will play the major role, permeating almost everything on display. Russian visitors will be seeing "live" displays, models, films and photographs.

Perhaps the most dramatic display will be an entire ceiling covered with the photographic result of the Mt. Palomar Sky Survey. The survey took seven years to compile, covers the entire sky to a depth of 600,000,000 light years as seen from Mt. Palomar, and consists of 1,758 photographic plates.

The remainder of the "Exploration of Space" section will include the X-15, the first U. S. vehicle designed to take a man to space and back, space capsules, a complete moon village, telescopes and sky cameras,

representations of the Van Allen radiation belt surrounding the earth, and miniature rocket instruments.

The last named exhibit will be somewhat underplayed because it is feared that the Russians might construe it as an excuse for the small size of our earth satellites. The Soviet press has poked fun at what it calls American "oranges."

The agricultural exhibit will include examples of the tremendous increase in farm production. It will be shown that hybrid corns in the past 25 years have raised the harvest by a billion bushels while corn acreage has been reduced 25%. There will be displays showing the uses of antibiotics in animals and plants to keep them healthy and to promote growth, radioactive isotopes for research, and chemicals against weeds and insects.

A great deal of space will be given to Salk vaccine in the public health and medicine section. Antibiotics, nuclear medicine and other treatments will point up the 20th century in therapy. Pittsburgh will be an example of the conquest of air pollution and New York's food and water controls will be shown.

The peaceful uses of atomic energy will be emphasized. Examples of our eight existing nuclear power plants will be promi-

nently displayed. Experimental test and research reactors, isotopes in medicine and agriculture, and isotopes for measurements and quality control in industry will be included in this section.

The Russians will be especially interested in the chemical research section, which will concentrate on plastics, a subject becoming increasingly important in the Soviet Union.

In the basic research section, the visitors may learn the names of the 34 U. S. scientists who won Nobel Prizes between 1943 and 1956. Some of America's current and recent basic research projects will be those conducted during the International Geophysical Year, the drilling of a hole through the earth's crust to its mantle, the nature of deoxyribonucleic acid, one of the basic chemicals of life, and the field ion microscope. The section also will contain a description of the relationship of the research done by the Government, industry, universities and non-profit institutions.

SCIENCE SERVICE is cooperating in displaying aids for elementary science education.

Science News Letter, May 16, 1959

## PUBLIC SAFETY

## Floods of Past 30 Years Have Claimed 2,430 Lives

► MORE THAN 2,400 people have died from floods that have occurred in the United States in the past 30 years.

The number of deaths per year has varied, but the annual toll was generally less than 100, data from the *Statistical Bulletin* of the Metropolitan Life Insurance Company show.

During the year 1931 there were no flood deaths reported. On the other hand, 302 were reported in 1955, the largest number for any year since 1927.

Floods have caused 555 deaths just within the past five years, 1954-58. The catastrophes that occurred in 1955 account for the majority of these deaths. The 1955 record was unusual also in that about two-thirds of the flood deaths that year occurred in the northeastern section of the country.

Nearly 200 lives were lost in Pennsylvania and Connecticut during the floods that followed the hurricane of Aug. 17 to 19, 1955.

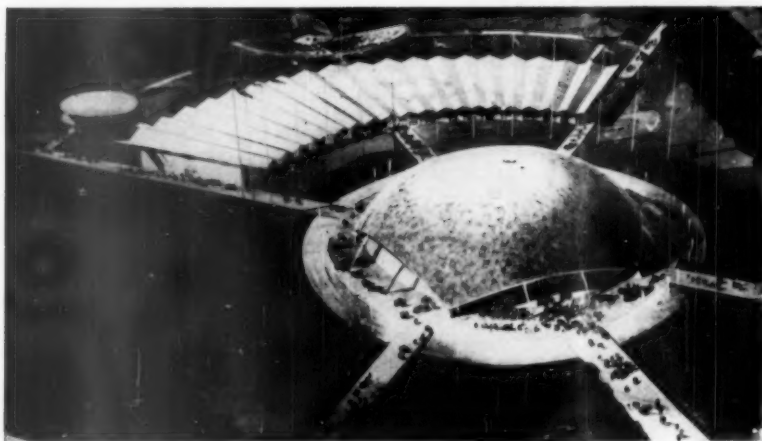
But the Ohio Valley experienced the largest loss of life from floods for the entire 30-year period, accounting for nearly one-fourth of the victims in the entire U. S.

Flood deaths were rare or infrequent in the Great Basin, which includes Nevada and surrounding states, the East Gulf, the Colorado and the Great Lakes Districts.

The peak incidence of mortality usually occurs in late spring and early summer. Severe floods at these times of the year are often the result of a combination of factors such as large accumulations of snow, the break-up of river ice, excessively warm spring temperatures and persistently heavy rains over a wide area.

Flood control programs now include effective measures such as reforestation of watersheds, construction of reservoirs and flood walls, the diversion of rivers.

Science News Letter, May 16, 1959



**EXHIBITION BUILDINGS**—A preliminary architect's sketch shows the buildings and landscaping planned for the scientific and cultural exhibition. In the foreground is a gold-tint aluminum geodesic dome, 200 feet in diameter, which will serve as an information center and house various exhibits. The fan-like building behind the dome will be some 400 feet across and 28 feet high, built of glass, steel and aluminum; it will contain cultural and industrial exhibits. Circarama films, thrown on a circular screen in a 360-degree arc from 11 projectors, will be shown in the round building at the left. The Soviet Union has agreed to purchase the buildings after the exhibition.

## BIOLOGY

## X-Rays Cause Sterility

► **MOTHERS GIVEN** X-ray treatment while carrying unborn girl babies may have daughters who cannot themselves bear children.

The National Academy of Sciences was told by a team of Oak Ridge National Laboratory experts on atomic radiation this is indicated by experiments on mice.

If human beings react like mice, this has implications for the human race living in an atomic world.

In mice the effects of radiation vary tremendously according to the age of development of the mother mouse at the time she is exposed to the X-rays.

The Oak Ridge experimenters were Drs. W. L. Russell, Liane Brauch Russell, M. H. Steele and E. L. Phipps.

The fertility of females that had received 300 roentgens of X-rays on the day of birth was not greatly affected, even when the amount was delivered in a single burst at the acute dose rate of 89-90 roentgens per minute. These females commonly produced nine or ten litters when they reached maturity. Yet, adult female mice given the same acute dose never produced more than two litters. Even a dose of 50 roentgens of acute irradiation was considerably more damaging to the fertility of adults than 300 roentgens given to new-born females.

Thus the ovary of the new-born showed high resistance to X-rays. However, the

ovary proved to be extremely sensitive to low amounts of radiation during the second week after birth. Mice exposed to X-rays at this infant stage in their development became sterile after producing either a single litter or a second, smaller one.

Adult females that had been given the same low total dose at the same low dose rate as their two-week-old counterparts showed no significant difference from mice that did not receive radiation. The mice produced an average of 13.3 litters.

Thus it is apparent that the second week of life is a radiation-sensitive period for the female. This period also coincides with the time when the immature reproductive cells have just reached the stage in which they will remain throughout most of their adult life.

The human ovary is suspected of being extremely sensitive at a comparable stage of development. This stage in the human is apparently attained, not during the second week after birth, but at some time before birth. This raises the unfortunate possibility that even quite a low dose of radiation can cause sterility in a human fetus, the investigators said.

In addition, this dose may be much lower than would have been guessed from the effects of radiation on the adult ovary, they concluded.

Science News Letter, May 16, 1959

## BIOLOGY

## Climate Affects Health

► **CLIMATE** can be blamed for ills, even beyond the cold drafts that sometimes accompany colds and other respiratory ills.

Dr. Rene J. Dubos, member of the Rockefeller Institute, New York, told the National Academy of Sciences that more and more examples are being reported of the complex and varied effects of climate on all forms of life, from the virus to man. It is becoming increasingly important for the biologist to be aware of the influences that physical environment has on biological processes, it was reported to an Academy symposium.

Some of the most commonly accepted relationships between weather and man's health—the increase in colds in the winter months and in polio in the summer—are still unexplained. Dr. Dubos also pointed out that there are "seasonal ebbs and flows" in diabetes and circulatory diseases.

Studies of man and other animals show that seasonal changes in hormone activity can be at the root of changes in physiological behavior like sugar metabolism and adrenal gland secretion. The effects of altitude on humans is a well-known example of another adjustment to climate. It has even been shown, Dr. Dubos added, that warm weather fronts are associated with a decrease, and cold fronts with an increase, in capillary resistance in man.

Climatic factors, which include ultra-

violet and other irradiation in addition to air and water temperatures, humidity, precipitation and winds, can also operate through genetic mechanisms, Dr. Dubos said. Thus animals living in colder climates are usually larger than related species living in warmer climates.

Recently, Dr. Dubos reported, small ionized air molecules have been recognized as influencing biological behavior. Some researchers claim that positive space charges have harmful effects while negative space charges have beneficial effects. Even human patients have apparently benefited from treatment with negative ions, he said.

Control of man's environment, at least indoors, has already been achieved with air conditioning. Yet, Dr. Dubos warned, the new-found comfort now may be followed by new respiratory and circulatory disorders in the future.

Science News Letter, May 16, 1959

## TEXTILES

## New Device Saves Cotton, Cuts Carding Costs

► **A "BACKWARD STEP"** in textile history is expected to save the textile industry millions of dollars each year in the future.

Cotton may be able to compete better

with synthetic fibers as a result, the U. S. Department of Agriculture has speculated.

Just as cotton carding machines 75 years ago used stationary flats to help them disentangle and arrange cotton fibers, so a new, modern machine will use stationary flats. This will do away with an elaborate assembly of moving flats used on present-day carding machines. However, the new machine also includes many advances in design and engineering.

But a stationary flat is the main innovation. It is a semi-cylindrical housing, granular on the inside, and designed to use air currents to help separate tufts of cotton into individual fibers, reported USDA researchers R. A. Rusca, R. S. Brown and A. L. Miller of the southern utilization division, New Orleans. The new granular card weighs about 200 pounds compared with almost 1,000 for the moving flats it replaces. Upkeep is low and a major source of dust in textile mills should be eliminated since the carding machine is completely sealed when in use.

In pilot tests with various types of cotton from three growing areas, the machine cut cotton waste by more than half. Limited mill-scale tests also showed that fewer knots were left in the fiber.

Science News Letter, May 16, 1959

## AERONAUTICS

## Supersonic Capsule Designed for Jet Pilots

### See Front Cover

► **A ROCKET-PROPELLED** capsule which can shoot a pilot to safety from a doomed airplane within two seconds has been designed by engineers at Republic Aviation Corporation.

During normal flight the capsule, shown in the photograph on the cover of this week's SCIENCE NEWS LETTER, functions as a seat. In an emergency, it automatically closes in around the pilot to form a protective cocoon and is then shot out of the plane along a short set of rails.

Although the system was designed for safe escape at speeds up to four times that of sound and at altitudes as high as 100,000 feet, it was also designed for safe ejection at extremely low altitudes and low speeds. A ballistic parachute, which is instantly and forcibly opened, is used in this case.

Science News Letter, May 16, 1959

## PHYSICS

## New Ceramic Magnets More Powerful Than Iron

► **CERAMIC MAGNETS** have been developed that, weight for weight, have two to three times the power of iron magnets and retain their strength at high temperatures. Produced by the Boeing Airplane Company in Seattle, the magnets are made by mixing two powdered metallic oxides, such as iron oxide and barium oxide. Boeing scientists have successfully induced the magnetic field while the ceramic is being formed under heat and pressure. This method appears to give the magnets longer life and stronger magnetic properties.

Science News Letter, May 16, 1959



## BIOLOGY

# Study Slime Molds

► THE DIRT in your backyard may explain how some cells become muscle cells, others bone cells, nerve cells, skin cells and so on for all the many parts of the body.

The tiny slime molds found in soil are being studied for clues to the process of cell differentiation in plants and animals. These organisms lead a double life: at one time they live an amoeba-like existence, later thousands of these amoebae stream together to form a complex many-celled structure with spores and a stalk.

Biologists studying the slime molds are trying to discover how cells become different in a regular and controlled way. Dr. John T. Bonner of Princeton University reported.

He told scientists at the National Science Foundation of progress so far in these studies.

There is evidence that when the slime mold amoebae stream together in a kind of mass migration a sorting out process follows. In a manner similar to what occurs in embryonic chick or frog tissue, for example, some amoebae become stalk cells while others become spores. An advantage the slime molds have over embryonic animal tissue is that the sorting out process can be observed in the normal, unmutated organism, Dr. Bonner said.

One explanation he offered for the regular and controlled way cell differentiation takes place is that individual cells may compete for certain positions during very early embryonic stages. Grafts made with a slime mold during its slug stage when it is about

one millimeter long have shown that cells have a definite "preference" as to location.

Thus cells in a piece from the front end grafted on to the back end of the slug would move to the front end of the "new" slug. This does not appear to be either genetically- or pre-determined, however.

Another interesting characteristic of the slime molds is the role played by an as yet unknown chemical that is responsible for making the single amoebae come together in one mass.

This chemical, which is emitted by a central amoeba, has a very powerful attractive force, Dr. Bonner said. Some recent research indicates it may be related to the estrogenic steroids since urine from pregnant animals exerts a similar, although weaker, attractive force over the cells.

Science News Letter, May 16, 1959

## AGRICULTURE

## Fatherless Potatoes Seen As New Aid to Breeders

► FATHERLESS POTATOES today may mean tastier potato salad for you tomorrow.

The potatoes produced by the fatherless potato plant might have better disease resistance, shallower eyes, and better cooking and processing quality—all because it has half the normal number of chromosomes.

One of the problems in improving our commercial potatoes is that they contain the tetraploid chromosome number of 48 (four times the basic number, 12, for po-

tatoes). Most wild species have 24 chromosomes, 12 from each parent. This has made it difficult to breed any of the desirable characteristics of the wild species into the commercial potatoes. Usually the results of any matings between wild and "tame" potatoes have been sterile.

Now, however, U. S. Department of Agriculture researchers have found a way of tagging commercial potato plants that have only half their normal number of chromosomes, the haploid number 24. Using these plants in crosses with desirable wild plants, the scientists can get the qualities they want in a fertile hybrid. Then as a final step, the chromosome number of these promising potatoes can be doubled to 48 with the drug colchicine and scientists can make crosses with normal commercial potatoes.

USDA geneticists R. W. Hougas and S. J. Peloquin, working cooperatively with the Wisconsin Agricultural Experiment Station, developed the technique for finding the naturally occurring haploid plants.

Higher yields from potato crops may be one result of the new breeding effort. The advantages of as many as five sets of chromosomes in a plant can be compared with the normal two sets, one from each parent.

Robert V. Akeley of the USDA's Agricultural Research Center, Beltsville, Md., said researchers are predicting that within ten years some 80% of the potatoes grown will be processed. It will be important, he pointed out, to have the right kind of potatoes for making chips, frozen or pre-cooked, dehydrated potatoes.

Science News Letter, May 16, 1959

## ENGINEERING

## New Scientific "Sniffer" Detects Fuel Tank Leaks

► A SCIENTIFIC "sniffer" is being used to detect elusive fuel tank leaks during the assembly of jet seaplanes.

The sniffer is said to be able to find leaks inside a wing fuel tank in a matter of minutes. Because an inside leak can be many feet away from where it appears on the outside, its detection without the sniffer would take hours or even days, reports the Martin Company, Baltimore, Md.

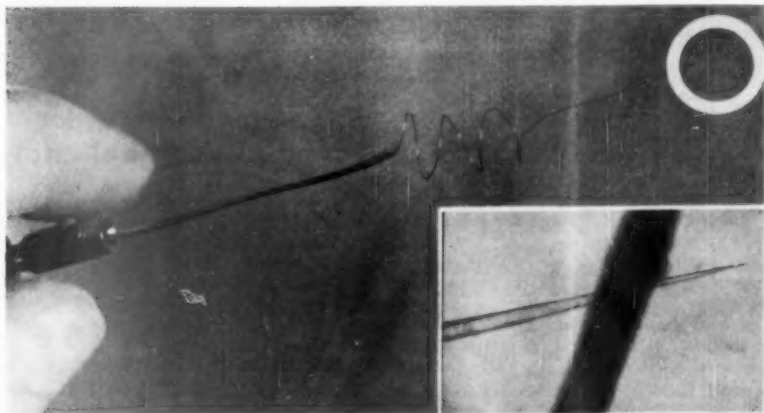
The sniffer is described as an infrared analyzer that uses nitrous oxide gas to trace the path of a fuel leak from the outside back to its source of origin inside the tank.

The unit's sensitivity can be adjusted to detect as little as 50 parts of nitrous oxide in a million parts of air.

To find an inside leak, a rubber cup fed with nitrous oxide is placed outside over the apparent leak. The cup confines the gas to this area at about five pounds per square inch, forcing the gas into the opening. The gas follows the leak path until it comes out on the inside.

An operator of a probe on the inside of the fuel tank moves the probe in the suspected area until a light starts flashing. This spots the leak.

Science News Letter, May 16, 1959



**ELECTRODE FOR HEART CELL**—An electrode so small at its tip that the point of contact covers only about 1/150 of the area of a single heart cell has been developed as a research tool at the National Jewish Hospital, Denver, Colo. A heated glass tube was slowly stretched to an almost invisible thinness; potassium chlorate solution, forced into the hollow filament by vacuum pressure, is the primary conductor. Copper wire inserted into the glass tube transmits the output of about 100 millivolts to a heavier wire which carries it to a recording mechanism. The inset photograph shows the tip, about 3/100,000 of an inch diameter, compared with an average human hair. Drs. Baruch Bromberger-Barnea and Paolo Caldini used the electrode to measure the single cell potentials of the human heart.

## SURGERY

**New Heart-Lung Machine Is Disposable, Part Nylon**

▶ A DISPOSABLE heart-lung machine is now being used successfully in operating rooms in several medical centers in the United States.

The apparatus is called the Pulmo-Pak. It is made of nylon filters, compartments, and tubes which takes expert "care" of the patient's blood while it is circulating outside the body.

This machine, marketed by Abbott Laboratories of North Chicago, is now being used in cardiac "dry-field" operations and in still newer procedures involving local cancer treatment. The apparatus is presently available for clinical investigation only.

The device has proven beneficial in a method of cancer treatment known as perfusion. This method consists of "sealing off" the limbs, intestine, liver, pelvis and lungs from the systemic circulation. Then highly toxic drugs that kill cancers are pumped through the isolated portion of the body while the heart-lung machine takes on the responsibilities of handling the blood while it is circulating outside the patient's body.

In this manner, drugs that would normally be too powerful for the body, can be applied to specific organs in greater strength.

The machine is operated by a standard pump but has no moving parts, requires no complicated preparation beforehand, and is sterile and disposable.

Blood that enters the device receives oxygen and rids itself of carbon dioxide. A fine mesh removes excess oxygen and fibrin, the stringy substance in the blood. Then it passes into the body of the patient. Heparin is used as an anticoagulant. If it were not, blood clots quickly would form while the blood is outside the body.

At the end of the operation, the drug must be neutralized so that the blood will again coagulate normally.

Research on isolated perfusion surgery has been done at a number of medical centers, including Tulane University, the University of Minnesota, Massachusetts General Hospital in Boston, and Columbia-Presbyterian Hospital in New York City.

Science News Letter, May 16, 1959

## BIOLOGY

**Royal Jelly From Bees Prevents Tumors in Mice**

▶ ROYAL JELLY, the mysterious food that the queen bee larvae eat, can completely suppress tumor development in mice.

It is also effective in preventing leukemia, three Canadian researchers report.

In what they describe as the "first unequivocal demonstration of an anti-tumor activity in royal jelly," the researchers say that mice receiving mixtures of royal jelly and leukemia cells survived while animals injected only with the leukemia cells died. The same results were obtained when ascitic tumor cells were used.

Further studies with whole royal jelly

and its components indicate that this anti-tumor activity is found in the main fatty acid of royal jelly, 10-hydroxydecanoic acid.

Royal jelly gave no protection when administered after tumor implantation. Nor were the mice protected by separate doses of jelly and leukemic cells. Acidity, pH below 6, of the protecting mixture was essential for anti-leukemic action, the scientists report.

Thirty milligrams of fresh whole royal jelly or 1.5 milligrams of 10-hydroxydecanoic acid completely inhibited the development of transplantable leukemia in the mice. However, slightly more of the material was needed to prevent the development of ascitic tumors: 100 milligrams of fresh, whole royal jelly were required.

"The results have been confirmed repeatedly on nearly 1,000 mice during a two-year period, and show a striking effect: either all the mice die quickly or all survive," the scientists say. In two groups of mice receiving identical numbers of tumor cells, those given royal jelly remained alive and healthy for more than 12 months while the others died within 12 days.

Gordon F. Townsend, Ontario Agricultural College, Joseph F. Morgan, Department of National Health and Welfare, Ottawa, and Barbara Hazlett, University of Toronto, report the research in *Nature* (May 2).

Science News Letter, May 16, 1959

## NUTRITION

**Milk Does Not Supply Baby With Enough Iron**

▶ MILK IS NOT the perfect food for babies.

Milk is a food that is very low in iron content, Dr. Edward H. Reisner, New York City specialist in blood abnormalities, reported to members of the Pennsylvania Academy of General Practice meeting in Bedford, Pa.

Milk is the major constituent of a baby's diet for the first six months of life. Therefore, the child must depend upon the supply of iron present in his body at birth. Yet, this is a period of very rapid growth in which the original supply becomes badly depleted, resulting in iron deficiency anemia, the specialist explained.

The anemia does not usually become apparent until the age of six months, and then not in every case. However, even apparently healthy infants of this age have significant depletion of their iron stores, he said.

Just early feeding of meat juices, eggs and vegetables will give the baby better supplies of iron, but by the time the deficiency is apparent, the absorption of iron through food is too slow. Dr. Reisner suggested administering iron to the child directly.

This can be done by mouth, but in premature, the very young, and with babies with feedings problems, it is better to give the iron by injection. Of the several types available for injection, a complex of iron with dextran is the safest and easiest to administer, the doctor concluded.

Science News Letter, May 16, 1959

**IN SCIENCE**

## PUBLIC SAFETY

**Special Group to Probe Radio Wave Safeguards**

▶ POSSIBLE safety measures that should be taken to protect the human body against radio waves, particularly high-powered radar, are the object of a special study committee set up by the American Standards Association.

The committee will also try to pin down measures to prevent radio waves from triggering off untimely explosions of powder and flammable fluids.

Need for such safety measures is becoming more acute with growing use of high-powered "ham" sets, particularly in automobiles.

Operating a strong transmitter near the site of blasting might inadvertently set off the blast prematurely and kill or hurt many workmen. The radio waves could be picked up by wires running to the blast charge and deliver enough energy to explode the dynamite.

It is understood that the Voice of America is especially concerned with the possibility, admittedly a remote one, of accidentally blowing up a whole ammunition dump that may be near one of its powerful voices to Iron Curtain countries — particularly the floating voice aboard the converted U.S. Coast Guard cutter *Courier*.

The committee's purpose will be to find and develop safeguards akin to the familiar dangling chain which finally cut down fires on oil-carrying trucks by draining off static electricity.

Science News Letter, May 16, 1959

## BOTANY

**Root Growth Retarder Found in Vegetable Kale**

▶ A MYSTERIOUS substance in kale apparently can keep some plants from germinating or can retard root growth.

The presence of a germination inhibitor in marrow stem kale was discovered when the problem of white clover seedlings' failure to germinate was studied.

When clover seeds were sown in the autumn following a summer crop of kale, the seeds might not germinate. If they did, A. G. Campbell of New Zealand's Department of Agriculture reports, the seedlings that emerged frequently died off in four to six weeks.

Laboratory studies indicate an inhibitor present in kale roots and, to a lesser amount, in kale leaves and stems permanently inhibits germination. Tests on ryegrass showed the substance drastically reduced root length.

A turnip plant and the weed spurrey may have the same effects, the scientist concludes in *Nature* (May 2).

Science News Letter, May 16, 1959



# IE FIELDS

## ENGINEERING

### Water Conversion Plant Is World's Largest

► THE WORLD'S largest single installation for converting sea water to fresh water has been constructed on the tiny semi-arid Dutch island of Balashi, Aruba. It is in the Caribbean off the Venezuelan coast.

The \$11,000,000 plant is the first ever constructed that combines salt water distillation with the production of marketable surplus electricity.

Designed and built for the Aruban Government by the New York engineering firm of Singmaster & Breyer, Inc., the plant has a rated capacity of 2,700,000 U. S. gallons of distilled water per day. This is more than enough to supply all of the drinkable water needed by the island's 55,000 inhabitants.

Recent technological advances have been so rapid, said William H. Finkeldey, president of Singmaster & Breyer, that a large water-conversion, power-producing plant built today and incorporating accepted technical developments could produce fresh water from sea water for less than \$1.00 per 1,000 gallons, assuming a credit from power sales.

At the new plant, production cost has been tentatively estimated as \$1.75 per 1,000 gallons of fresh water. A lower figure is expected, however, when exact cost data reflecting power revenues become available. Distribution expenses would, of course, increase the price to the consumer.

Cost of water by any process cannot be predicted safely until the specific conditions for a proposed plant are known, Mr. Finkeldey said. Among these conditions are location, the price of fuel, the type of process selected, amortization of investment, and local markets for electricity.

Surplus water and power are important factors in this island's plans for economic growth. Both are essential to its multi-million dollar resort development.

Science News Letter, May 16, 1959

## EDUCATION

### Young Scientists Invited For Summer Training

► A SCIENCE training program for promising high school students will be inaugurated at the University of Maine this summer. Under a grant by the National Science Foundation this is one of a total of 112 such nationwide programs.

SCIENCE SERVICE has joined with the University of Maine in the selection of students who will attend the program at Orono, Aug. 3 to 28. Invitations to the University of Maine-SCIENCE SERVICE program have been issued to students who have placed in the top 25% of regional science fairs in the northeastern United States.

The program is designed to give extraordinary training and experience to about 100 high school students who possess unusually high aptitudes for work in science. Strong consideration will be given applicants' records in science fairs and in the annual Science Talent Search as well as course grades. All must be in their junior or senior year of secondary schools.

Travel expenses to a maximum of \$120 for those chosen to attend will be paid. They will live in University dormitories without charge for room and board.

The program will not simply duplicate the work usually covered in high school or first year college courses. It is designed to broaden the student's background, to develop an appreciation of the interrelationships among sciences and to provide contact with research scientists.

Students will work in groups of about 25 according to the field of their major interest, biology, chemistry, mathematics, or physics.

Science News Letter, May 16, 1959

## ENDOCRINOLOGY

### Change of Thyroid Molecule Divides Effects

► SCIENTISTS have successfully juggled the basic molecule of the thyroid hormone so that it will do only the work desired, instead of producing a combination of good and bad effects.

The effects of the thyroid hormone in man now can be separated by changing the structure of the basic molecule, six investigators explained to scientists at the American Association of Physicians meeting in Atlantic City, N. J.

Now that the basic molecule can be changed, the effects of the hormone itself can be modified. For instance, thyroid hormone increases oxygen consumption by the body, lowers blood cholesterol and has a heat-producing effect. It also increases energy, mental alertness and appetite. Some of these effects are not needed in some patients, however. Others may even be dangerous.

For example, older patients frequently have a combination of low thyroid function and heart disease. If the usual thyroid hormone preparation is given to these patients, in addition to correcting the thyroid deficit, it raises oxygen consumption to a dangerous level in terms of heart condition.

If, however, a modified thyroid hormone is given, it produces all the needed effects without aggravating the heart condition.

It has also been possible to decrease the high levels of blood cholesterol characteristic of low thyroid function, and associated with atherosclerosis, without increasing oxygen consumption.

Studies of more than 60 different variations of the thyroid hormones were first run using laboratory animals. They produced a wide variety of biological effects, Drs. Rulon W. Rawson, William L. Money, Robert Kroc, Soichi Kumaoka, Richard S. Benua and Robert Leeper of the Sloan-Kettering Institute for Cancer Research and Memorial Center for Cancer and Allied Diseases, New York, reported.

Science News Letter, May 16, 1959

## SURGERY

### Small Hospitals Can Do "Open-Heart" Surgery

► OPEN-HEART operations can be performed in small community and city hospitals as well as in large medical centers.

Small hospitals can provide the necessary equipment, mainly a heart-lung machine, a trained surgeon and an interested and dedicated group of workers. Large medical centers are better able to provide the necessary physiological data. Since machinery for such data is expensive, the small hospitals need not provide this service, but could rely on the large centers for such information, four hospital staff members report in the *Journal of the American Medical Association* (May 2).

The open-heart operation does not need a vast assemblage of superscientists. Neither need there be a complex wilderness of gadgets surrounding the heart patient, say Drs. Alfred R. Henderson, Georges Oteifa and Robert R. Meijer and Harvey Black of Asbury Park, N. J. The men are affiliated with Fitkin Memorial Hospital, Neptune, N. J., Monmouth Medical Center, Long Branch, N. J., and Riverview Hospital, Red Bank, N. J.

There are at least 25,000 persons in the United States who annually are eligible for heart surgery. Many of these persons who otherwise could not receive treatment can be saved if heart surgery is available in small hospitals.

The four recommended that each member of an operating team be fully trained in his role in the operating room by repeated performance in the experimental laboratory. Repetition in the laboratory will make each individual procedure "as perfect and mechanistic as that of eating a meal."

The team should begin by performing the less difficult operations, such as those for the repair of holes in the heart walls. Gradually they may add the more difficult procedures, such as the "blue baby operation."

Science News Letter, May 16, 1959

## EDUCATION

### Quiet Movie Projectors Beat TV as Teachers

► QUIET MOVIE projectors are better training aids than closed-circuit television. Dr. F. J. McGrane of American Machine and Foundry Company and M. L. Baron of the U. S. Army Signal Equipment Support Agency at Fort Monmouth, N. J., reported on studies to the Society of Motion Picture and Television Engineers meeting in Miami Beach, Fla.

They said the difference might be due to TV's "small size of the screen (21-inch), lack of color, lack of a truly clear, bright, sharp picture and perhaps a 'conditioned reflex' involving previous use of television for 'entertainment' purposes rather than 'educational.'"

But TV ran neck-and-neck with noisy movie projectors as teachers in Army training.

Science News Letter, May 16, 1959

## PHYSIOLOGY

# All-Season Hibernation

A select group of mammals is being induced to hibernate at any time of the year. Their laboratory sleep is contributing to man's knowledge of hibernation.

By HOWARD SIMONS

► THIS SUMMER in Boston, a small, select group of animals will be lulled into the feeling that it is not summer at all, and be induced to hibernate.

This will not be an unusual feat for these particular animals, for they are hibernating mammals that have been experiencing induced hibernation at any time of the year in the laboratories of Dr. Charles P. Lyman of the Harvard Medical School and Museum of Comparative Zoology.

In their natural habitat, these same animals would instinctively hibernate each fall without the help of Dr. Lyman, or anyone else. Much has been learned about this unique ability of some animals to spend the long winter months in a form of exaggerated sleep. Much, however, remains a mystery, as we shall see.

A "Who's Who" of the warm-blooded hibernators is not very long. It includes among others the hedgehog, several rodents and bats, the hummingbird and the whip-poorwill. There is a theoretical explanation why these animals hibernate. Winter in cold climates is hard on most animals—particularly for the insect- and plant-eating animals, which include all the hibernators.

## Avoiding Winter

By trial and error animals have found ways around winter's harshness. Some go south, others store food and still others add a thick coat of fur. Finally, a few have learned over a long period of time how to curl into a tight ball and to sleep away their wintry displeasures. Winter seems no less harsh on most humans, many of whom have adapted the animals' defenses for comfort—going south, making themselves as comfortable as possible, or adding a thick coat of fur.

No human, however, has been able to curl into a tight ball and hibernate, and from present evidence it is doubtful that one will.

The definition of hibernation is important. Dr. Lyman, together with the late Dr. Paul O. Chatfield of the National Institutes of Health, Bethesda, Md., chose always to distinguish between "deep hibernators" and "deep sleepers." The former exhibit a profound drop in body temperature and concurrent decreases in breathing and heart rate. The latter do not.

This definition eliminates the black bear as a hibernator. Drs. Lyman and Chatfield explained to many disbelieving trappers and woodsmen that although the bear spends a part of the winter in a dormant state, it is not hibernating. It fails to show a

striking drop in body temperature or metabolic rate.

Still incredulous, a few intrepid outdoorsmen offered to enter a bear's den in mid-winter and kick an old bruin to prove it was a notch above a "deep sleeper." The offers were not accepted.

Definition is important in another area. Hibernation is often confused with hypothermia, the practice of "freezing" humans to live during surgery. The two are very different. It is interesting to note, for example, that a hibernating mammal that is subjected to artificial freezing will die a short time after its body temperature reaches five degrees centigrade (41 degrees Fahrenheit). However, the same animal can lower its body temperature to the same degree or lower through the hibernating process and live to awaken in the spring.

It is also important to note that a human heart fibrillates at body temperatures between 70 and 80 degrees Fahrenheit. Dr. Lyman and his co-workers have found evidence that some heart and muscle tissue of hibernating mammals differs from that of nonhibernators, including man.

Hibernators must prepare for their long winter's sleep. Some, like the woodchuck and thirteen-lined ground squirrel, add body fat and live from it without awakening. Others, like the golden hamster, store food

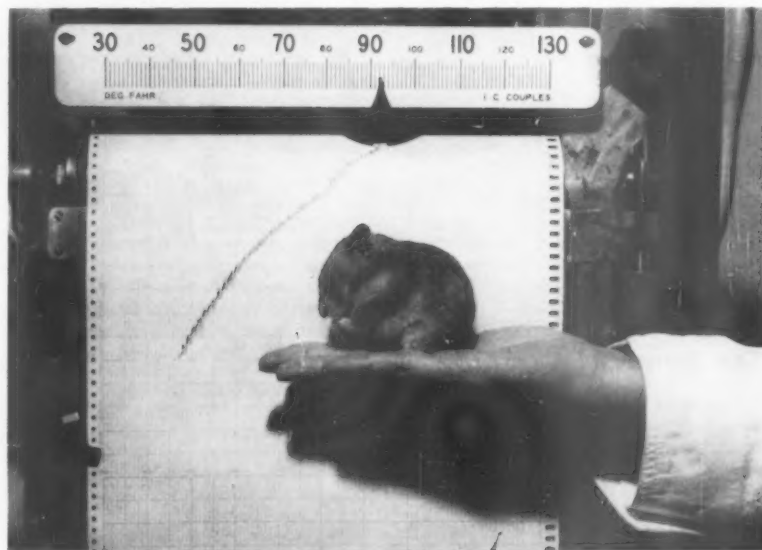
and awaken periodically to eat it. There are three stages in hibernation, each undergoing intensive study in Dr. Lyman's laboratories: entering the dormant state; remaining in hibernation and awakening.

As yet, no one knows what triggers hibernation. By the same token, no one fully understands what triggers awakening. Dr. Lyman suspects that the sympathetic nervous system is in some way involved in both processes. He thinks the "thermostat" of hibernating animals may be turned both up and down by the hypothalamus, an area of the brain that is connected with most vital body functions, as well as the "waking and sleeping centers." He does not rule out the possibility that a building up of waste material throughout hibernation might also contribute to the waking process.

## Descent Into Sleep

The descent from a fully awake active animal to a deep hibernator is dramatic. In some animals it is a smooth transition. In others, it is stepwise. A hamster, experimentally induced to hibernate, lowers its body temperature to near freezing, its heart rate to four to ten beats per minute (from 250 to 270), and its breathing to less than ten breaths per minute characterizing a metabolic decrease of from 1/30 to 1/100 of the normal resting rate.

The Harvard researcher and his co-workers found that the hamster's temperature remains about one degree above that of the environmental temperature and regu-



**WINTER SLEEPER**—This little fellow, perched on the palm of a Harvard University researcher, is a golden hamster—a hibernating mammal. He is being made to hibernate experimentally at any time of the year. The temperature gauge in the background registers the hamster's normal body temperature. The chart shows its body temperature in hibernation.

lates itself automatically as the outside temperature changes.

If the temperature is dropped below freezing (32 degrees Fahrenheit), however, the researchers found that the hamster will increase its metabolism three-fold or more and even awaken. This may account for the fact that hibernators are not found far north of the Arctic Circle.

Once in hibernation, all mammals curl into a tight ball with their heads tucked beneath their tails. Their hair remains erect effecting maximum insulation against loss of body heat. In this state all bodily processes are slowed to a minimum.

In many respects the hibernator is in a period of immunity from disease, aging and other dangers. If such an animal is subjected to a lethal dose of radiation during hibernation, for example, it does not die or show ill effects. In the same way, if a cancer is transplanted in a hibernating animal, the animal will not succumb. There is a "but," however, and it is, when the hibernator awakens it will die from radiation poisoning or cancer.

### Lively Sleep

Up to the present it was thought that hibernating animals do not age in their dormant state. Recent experiments by a graduate student working with Dr. Lyman, however, indicate that some growth is taking place.

Poke a hibernator and get an arousal! This is not an immediate reaction, however. Stimulated arousal occurs in the same manner as natural arousal. In the hamster the awakening process takes about three hours. It starts with a quickening of respiration, followed by a rise in the heart rate. In less than two hours, Dr. Lyman has found, the respiratory rate is over 100, the heart rate is up to 550 beats per minute, twice its normal rate, and the body temperature is 86 degrees Fahrenheit. An hour later its breathing and heart are normal and its body temperature is 98 degrees Fahrenheit.

Commenting on the arousal process, Dr. Lyman says that "only death can stop the animal from struggling to regain its homeothermic temperature."

Hibernating mammals cannot be kept hibernating forever, even experimentally. The longest continuous period of hibernation was reported by a French researcher, C. Kayser, who recorded a 114-day dormancy for a common dormouse. The usual period of hibernation is considered to be much shorter than this.

### International Study

Interest in hibernation has increased since the end of World War II. Studies are currently being undertaken in many laboratories in the United States and in France, Finland, Sweden and Russia. On May 13, hibernation experts from throughout the world gathered in Boston to compare notes and discuss their recent findings.

Science News Letter, May 16, 1959

### PUBLIC HEALTH

## Lung Cancer Total High

► SOME 31,000 persons in the United States will be stricken with lung cancer this year.

Of this number, 26,000 will be males and 5,000 will be women. The recovery rate for this disease is below five percent.

No one knows just what causes this disease, but one famous theory holds that smoking tobacco products produces cancer.

Within the past few years, the lung-cancer-smoking controversy has flared like the smoldering end of a cigarette at each puff.

For instance, Dr. Alton Ochsner, surgeon at the Ochsner Clinic in New Orleans, points out that the incidence of lung cancer has increased proportionately to the increase in cigarette sales in this country.

"It is my firm conviction that every heavy smoker will develop lung cancer — unless heart disease or some other sickness claims him earlier," Dr. Ochsner says in *Today's Health*, a publication of the American Medical Association. The article carries the notation that the House of Delegates of the AMA has not taken a position on the possible relationship between smoking and lung cancer, due to the considerable difference of opinion among medical authorities.

Four other lung cancer experts recently

met and decided further research is required before anything definite can be said about the possible link between smoking and lung cancer. These four, three of whom are smokers, were Dr. Seymour M. Farber, chief of the University of California's Tuberculosis and Chest Service; Dr. Carlo Sirtori of Milan, Italy; Dr. Bernard Pierson, France; and Dr. Anton Sattler, Vienna, Austria.

The experts have stressed that lung cancer is becoming the number one killer among males more than 40 years of age. Lung cancer in the U. S. has increased 400 times in the past 30 years, Dr. Farber said.

However, none would attribute the increasing death rate to smoking. Dr. Farber suggests that perhaps the fact that men have to work in smoke-filled cities and factories may have a key role in the development of lung cancer.

A two to six year study of 6,000 persons who showed no symptoms of lung cancer initially was conducted by Dr. David A. Cooper of the University of Pennsylvania. At the end of the investigation period, 86 of the 6,000 had developed lung cancer. Of these victims, 85 were smokers, Dr. Cooper said.

Science News Letter, May 16, 1959

### OCEANOGRAPHY

## Renew Deep Ocean

► THE TIME NEEDED for deep ocean water to renew itself is at least 300 years.

Dr. Henry Stommel of Woods Hole Oceanographic Institution, Woods Hole, Mass., said his mathematical model of circulation patterns in the world's oceans gave the 300-year figure. Actual measurements, he reported to the National Academy of Sciences meeting in Washington, indicate the complete turnover of all the ocean below 6,600 feet may take as long as 1,800 years.

Dr. Stommel said the mathematical ocean model was devised with Dr. Allan Robinson of Harvard University. He reported that his theory also predicts the existence of a large northward flowing deep current over the Tonga Kermadec Trench in the western South Pacific off New Zealand. This current supplies the entire Pacific Ocean with deep water. Exploration is underway to determine whether this predicted ocean current actually exists or not.

Another deep ocean current, flowing southward under the Gulf Stream, is also indicated from the model. Dr. John C. Swallow of the National Institution of Oceanography, Sussex, England, reported his direct measurements of this deep current to the Academy symposium on the deep sea.

Dr. F. F. Koczy of the University of Miami Marine Laboratory, Coral Gables, Fla., said measurements of the distribution

of radium showed that the total surface layer of the Atlantic Ocean is renewed by bottom water in about 300 years. In the Pacific, however, it takes about 1,500 years for the surface waters to be replaced completely by deep water.

Dr. Stommel reported that the mathematical model he developed with Dr. Robinson followed publication of a "pioneering study" by Dr. P. S. Lineykin of the State Oceanographical Institute in Moscow. The Russian scientist attempted to explain the full three-dimensional field of current, temperature and density in an ocean acted upon simultaneously by wind and heating.

After studying this paper, Dr. Stommel and his Woods Hole colleagues concluded the Russian model was applicable only to rather small-scale seas and lakes, like the Caspian Sea, but did not apply to the large-scale oceans. Both the Moscow and American scientists suggested in 1957 preliminary versions of a model similar to the one Dr. Stommel reported.

The new model, Dr. Stommel said, allows oceanographers to compute the vertical distribution of the currents in the ocean and the vertical temperature-density structure as a result of the combined action of wind stress and of heating and cooling. In order to make these computations, a hypothetical quantity that describes the vertical mixing of ocean water had to be introduced.

Science News Letter, May 16, 1959



# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**THE ABC OF RELATIVITY**—Bertrand Russell—*New Am. Lib.*, rev. ed. by Felix Pirani, 144 p., paper, 50¢. Discusses Einstein's theories, using analogies from everyday experiences.

**THE ALGEBRA OF ELECTRONICS**—Chester H. Page—*Van Nostrand*, 258 p., \$8.75. Guide to a practical understanding of electronic circuits, more than 100 problems with methods and answers.

**ALL ABOUT TROPICAL FISH**—Derek McInerney and Geoffrey Gerard, foreword by H. F. Vinall—*Macmillan*, 480 p., 300 illus., 100 in color, \$15. Covers the whole field of aquaria, written in non-technical language, useful to beginner as well as expert.

**ANNUAL RESEARCH TASK SUMMARY 1959**, Vol. 1: Biological, Medical, Social and Behavioral Sciences and Operations Research—Army Research Office, Arthur G. Trudeau, Chief—*Dept. of the Army (Off. of Tech. Serv.)*, 315 p., paper, \$3.25. Briefs of purpose, scope, approach and status of projects.

**APPLICATIONS OF FINITE GROUPS**—J. S. Lomont—*Academic*, 346 p., \$11. Provides mathematical background for reading the physics literature and offers variety of examples of applications of finite groups to problems of physics.

**AS THE PRO FLIES: Flying Expertly**, in a Professional Manner—John R. Hoyt—*McGraw*, 271 p., illus. by Mary N. Hoyt, cartoons by Mel Lazarus, \$4.95. Covers the mechanics of

modern flight and the psychological elements a good pilot must master.

**ASPECTS OF THE ORGANIC CHEMISTRY OF SULPHUR**—Frederick Challenger—*Academic*, 253 p., \$7.50. Of special interest to organic chemists, biochemists and those working in pharmaceutical and petroleum industry.

**1958 BOOK OF ASTM STANDARDS INCLUDING TENTATIVES, PART 5: MASONRY PRODUCTS, CERAMICS, Thermal Insulation, Acoustical Materials, Sandwich and Building Constructions, Fire Tests**—*Am. Soc. for Testing Materials*, 1118 p., illus., 226 standards, \$12. Reference work on asbestos-cement products, brick, structural tile, refractories, glass, pipe and drain tile, and other materials.

**BOSTON'S IMMIGRANTS: A study in Acculturation**—Oscar Handlin—*Belknap Press, Harvard Univ. Press*, rev. ed., 382 p., illus., \$6.75. Enlarged by new material covering an additional fifteen years from 1865 to 1880.

**THE CANAL BUILDERS: The Story of Canal Engineers through the Ages**—Robert Payne—*Macmillan*, 278 p., illus., \$5. Highlights engineering marvels from ancient times to the St. Lawrence Seaway.

**THE CLOCK WE LIVE ON**—Isaac Asimov—*Abelard-Schuman*, 160 p., illus. by John Bradford, \$3. Comprehensive story of the astronomy, geography and history behind man's effort to establish time and the calendar in relation to sun, earth and moon.

**EVERYDAY METEOROLOGY**—A. Austin Miller and M. Parry—*Philosophical Lib.*, 270 p., illus., \$7.50. Popular work by British meteorologists explains in detail the science of the weather with advice for amateur observers.

**EVOLUTION, MARXIAN BIOLOGY, AND THE SOCIAL SCENE**—Conway Zirkle—*Univ. of Pa. Press*, 527 p., \$7.50. Documented presentation of the Marxian distortion of genetics and its influence on the western scholarly world.

**EXPERIMENTAL ELECTRICITY FOR BOYS**—Willard Doan—*Rider*, 124 p., illus., \$3.45. Instruction and experiments in electricity for the teenager.

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Letter from the Secretary of Commerce—U.S. Congress, Comm. on Public Works—*Govt. Print. Off.*, 232 p., paper, 60¢. Contains findings and recommendations of study made to determine federal role in promoting highway safety.

**FIRST UNDER THE NORTH POLE: The Voyage of the Nautilus**—Commander William R. Anderson—*World Pub. Co.*, 64 p., illus., \$2.75. Tells young readers what the crew did during the dramatic 96-hour voyage.

**HELICOPTERS AND AUTOGYROS OF THE WORLD**—Paul Lambermont and Anthony Pirie, foreword by Igor I. Sikorsky—*Philosophical Lib.*, 255 p., photographs 64 p., \$10. Chronological historical survey, followed by country-by-country compilation of helicopters produced.

**HOUSE PLANTS: For the Indoor Gardener**—Editors of *Better Homes & Gardens*—*Meredith Pub. Co.*, 160 p., 300 illus., \$2.95. Colorful guide to the needs of house plants, treats familiar as well as exotic plants in well organized fashion.

**HOW TO FINANCE A COLLEGE EDUCATION**—W. Bradford Craig—*Holt*, 79 p., paper, \$1.95. Points out plans to assist families in meeting college expenses of promising students. Author is director of Princeton University's Bureau of Student Aid.

**HOW TO GET THE BEST EDUCATION FOR YOUR CHILD**—Benjamin and Lillian Fine—*Putnam*, 251 p., \$3.95. Tells parents how to size up schools, with chapter on helping the gifted child.

**THE INEFFECTIVE SOLDIER: Lessons for Management and the Nation**, 3 Vols.: *The Lost Divisions, Breakdown and Recovery, and Patterns of Performance*—Eli Ginzberg and others, foreword by Major General Howard McC. Snyder—*Columbia Univ. Press*, 225 p., 284 p., and 340 p. resp., \$6 each, set of three \$18. Study based on analysis of the Army and Selective Service records of men rejected or separated from service in World War II because of inaptitude, personality defects or psychoneurosis.

**INSECT BUILDERS AND CRAFTSMEN**—Ross E. Hutchins—*Rand McNally*, 96 p., photographs by author, \$2.95. About the remarkable structures created by some insects, also tells young people how to study these insect engineers.

**AN INTRODUCTION TO ANTHROPOLOGY**—Ralph L. Beals and Harry Hoijer—*Macmillan*, 2nd ed., 721 p., illus. by Virginia More Riediger, \$6.50. College textbook.

**AN INTRODUCTION TO CHEMICAL ENGINEERING**—Charles E. Littlejohn and George F. Meenaghan—*Reinhold*, 271 p., \$7.80. Beginning text explaining some of the fundamentals upon which chemical engineering theory is based.

**INTRODUCTORY CALCULUS**—Donald E. Richmond—*Addison-Wesley*, 207 p., \$5.50. One-semester course in calculus, pre-supposing no knowledge of analytic geometry or trigonometry.

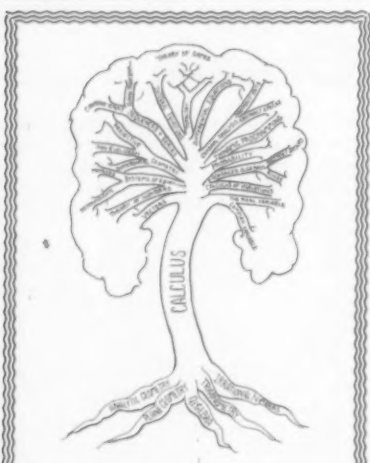
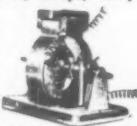
**ISLAND IN THE DESERT: The Challenge of the Nile**—Charles R. Joy—*Coward-McCann*, 96 p., illus., \$2.50. In simple language tells of the challenges, achievements and problems of modern Egypt.

ISLAND OF THE DRAGON'S BLOOD—Douglas

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Science News Letter, May 16, 1959

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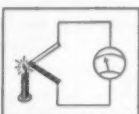


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## Questions

AGRICULTURE—What is the chromosome number of commercial potatoes? p. 311.

ASTRONAUTICS—What might the moon's atmosphere consist of? p. 307.

ENDOCRINOLOGY—How has thyroid hormone therapy been improved? p. 313.

PUBLIC SAFETY—Where in the United States has there been the greatest loss of life due to floods? p. 309.

Photographs: Cover, Republic Aviation Corporation; p. 307, The Babcock & Wilcox Company; pp. 308 and 314, Harvard University; p. 309, Office of the American National Exhibition in Moscow; p. 311, National Jewish Hospital at Denver; p. 320, Fremont Davis.

## Do You Know

Cryogenics is the science of low temperatures—hundreds of degrees below zero.

Urea in 1828 became the first organic chemical to be synthesized.

The average home in or near a large city accumulates about two pounds of dirt a week through open windows and doors.

During 1958, drivers under 25 were involved in 27.1% of all fatal accidents and more than 20% of non-fatal crashes.

A process for converting coffee beans to caffeine, oil, and a meal, has been developed to utilize some of Brazil's enormous coffee surplus.

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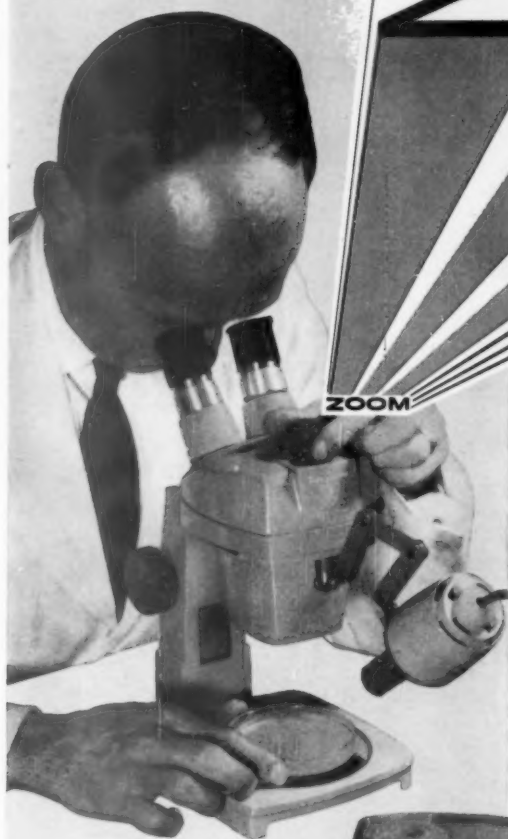
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**RADIO-BINOCULARS** is a unit consisting of binoculars and a portable transistor radio that can be used separately or together. The binoculars are three-and-a-half-power with center focusing adjustment. The radio has an antenna built into the carrying strap and an earplug for private listening.

Science News Letter, May 16, 1959

**FLEXIBLE HEATING TAPE** conducts electricity without built-in wires. Made of woven glass fibers impregnated with conductive silicone rubber, it can be cut to any desired length and still maintain a uniform temperature at any spot on the surface. It is expected to solve some heating problems in the plastics industry.

Science News Letter, May 16, 1959

**SAFETY LIGHT** that rotates and wavers automatically at the slightest vibration is lighted by giving the dome a clockwise twist. For use on belts, bicycles, boats and other vehicles, the light consists of a plastic base and dome containing a spring mounted bulb and two small batteries. It comes in red, amber, blue or green.

Science News Letter, May 16, 1959

**ADDITION-SLIDE RULE**, shown in the photograph, has a five-inch slide rule with a ruler and 13 precision scales. On



the reverse side is a device for quick addition or subtraction up to 999,999. The aluminum and brass adding device is operated by a stylus contained in the rule's leather case.

Science News Letter, May 16, 1959

**WATER-PIPE COVERS** zip on to cold water pipes to prevent dripping resulting from condensation. Available in standard decorator colors, the covers are said to stem corrosion, halt bacteria growth around moist

pipes and prevent rotting of walls and floors around the pipes.

Science News Letter, May 16, 1959

**CLEATED STEP PLATES** may be screwed to the gunwales of small craft to give crewmen secure footing. Made of transparent plastic, they also protect the finish of the planking and permit it to be seen. The plates, available in pairs in two different sizes, are resistant to impact, exposure to sunlight, salt water and air.

Science News Letter, May 16, 1959

**KITCHEN SET** consists of a paddle-shaped copper-color anodized aluminum salt and pepper shakers, a stainless steel stirring spoon, and a wall bracket equipped with hooks from which the other three pieces are hung. The spoon has a small hook at the base of the handle for hanging the spoon over the inside rim of a pot.

Science News Letter, May 16, 1959

**INSECT TRAP** lights up outdoor areas and catches insects too. It consists of a small motor and fan located right below a light bulb. The movement of the fan sucks insects attracted by the light downward and into a collecting bag. Most of the bugs will be killed by the blades. Others can be kept trapped till they die.

Science News Letter, May 16, 1959



## Nature Ramblings



By HORACE LOFTIN

► THE BALDING dome of the timber executive gleamed like a beacon in the lights of the convention hall. With a reflected glint in his eye, another balding gentleman approached the executive, spoke to him earnestly for a few minutes, then stuck out his hand. The timberman dug into his wallet, gave the solicitor a dollar bill, and thereupon became a life member in America's most unique club.

The club? The Bald Eagle Club, open to all who possess a balding pate or silvery locks like that great bird of prey.

The Bald Eagle Club was established about a decade ago by Donald B. Hyde, a lumberman from Waltham, Mass. In the course of his business he became interested in the relation of bird life to our forests. As he attended conventions of lumber merchants throughout the country, Hyde began to buttonhole his balding or graying asso-

### The Bald Eagle Club



ciates for a dollar life membership in the "club." Funds received were used to promote research and public appreciation of this rapidly disappearing bird.

After Mr. Hyde's death, the Club went into a state of inactivity. But this year, his widow sent \$285 in funds remaining in the Club treasury to the Florida Audubon Society to assist in that group's work in bald eagle conservation. This signaled the reawakening of the Bald Eagle Club as

Audubon leader Russ Mason, himself a fully qualified member, announced from his Maitland, Fla., headquarters that membership rolls will again be opened.

Though the Bald Eagle Club has an informal character, its basic purpose is a very serious one. The national bird has diminished greatly in numbers, even in its major strongholds in Alaska and Florida. Why the bird is disappearing is not known, and the Florida Audubon Society hopes to establish a research fellowship to find out why and what can be done about it.

Incidentally, as with the members of the Bald Eagle Club, it takes several years for even the eagle to attain its mark of distinction, the gleaming dome. Some five years must pass before the bird acquires its white head.

As one enthusiastic charter member has summed it up: Where else in this age of inflation can you have a Life Membership to anything for a dollar?

Science News Letter, May 16, 1959

